FACULTY OF ENGINEERING
B.E. (Civil) IV-Semester (CBCS) (Supplementary) Examination, December 2019

Subject : Surveying - II

Time : 3 hours   **Max. Marks : 70**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (20 Marks)

1 What is spire test? How is it conducted?	2
2 Explain the temporary adjustments of a theodolite.	2
3 Explain briefly the instruments used in tacheometry.	2
4 What is trigonometrical leveling? What are its uses?	2
5 What is versed sine of a curve? Express it mathematically.	2
6 With a neat sketch show the various elements of a transition curve.	2
7 Enumerate the problems in setting out simple curves.	2
8 Give the reasons for preferring a parabola for vertical curves.	2
9 What is GPS? Explain briefly.	2
10 Briefly explain the principles of aerial photogrammetry.	2

PART – B (50 Marks)

11 a) Explain with a neat sketch the measurement of horizontal angles by re-iteration method.   5

   b) What are omitted measurements in traverse survey? Discuss the various cases.   5

12 a) State the various methods of balancing a closed traverse. Explain any one method in detail.   4

   b) Find the R.L. of Q from the following observation :
      Horizontal distance between P and Q 9290m, Angle of elevation from P and Q = 20 6' 18" Height of signal at Q = 3.96m, Height of instrument at P = 1.25m
      Coefficient of refraction = 0.07, Rsin1" = 30.88m, R.L. of P = 396.58m   6

13 a) Derive a relationship between radius and degree of the curve.   3

   b) Two straights AB and BC intersect at a chainage of 4242.00m. The angle of deflection is 140^0. It is required to set out a simple circular curve of radius 150m to connect the straights. Calculate all the data necessary to set out the curve by the method of offsets from the chords produced with an interval of 30m.   7

14 a) Explain the tangent correction method.   4

   b) A road bend which deflects by 80^0 is to be designed for a maximum speed of 120 kmph, a maximum centrifugal ratio of ¼, and a maximum rate of change of radial acceleration of 30 cm/s^3. The curve should consist of a circular arc combined with two cubic spirals. Calculate   a) Radius of the circular arc   b) The requisite length of transition curve, and   c) Total length of composite curve.   6

15 What is GIS? What are its objectives? What are its components? Briefly explain the advantages and its applications.   10

16 a) Explain in detail about the EMR spectrum.   5

   b) What are the different methods of setting out simple circular curves? Briefly explain them.   5

17 Write short notes on   10
   a) Gale's traverse table
   b) Applications of Remote Sensing in Civil Engineering
   c) Errors in theodolite survey

******

FACULTY OF ENGINEERING
B.E. IV-Semester (CBCS) (EEE) (Suppl.) Examination, December 2019

Subject : Power system - I

Time: 3 Hours   Max Marks :70

Note: Answer all questions in Part-A & Any five questions from Part-B.

Part - A (20 Marks)

1	Differentiate between fixed and operating costs of a power plant. List the items which constitute the fixed and operating costs.	2M
2	Define load factor. Discuss its importance.	2M
3	What are the advantages of using pulverized coal?	2M
4	What is a hydro graph? What information does it provide?	2M
5	Bring out the differences between fission and fusion.	2M
6	List the various types of wind turbines.	2M
7	Why are the cables graded?	2M
8	Discuss the desirable properties of insulators.	2M
9	What is the need for transposition of conductors?	2M
10	Write the expression for capacitance of a 3- system.	2M

Part - B (50 Marks)

11 a) Mention the advantages of 3-wire dc distribution system over 2-wire distribution.   4M

 b) A factory takes a load of 200 kW at 0.85 pf lagging for 2500 hours per annum. The tariff is Rs. 150 per kVA plus 5 paise per kWh consumed. If the power factor is improved to 0.9 lagging by means of capacitors costing Rs. 420 per kVAR and having a power loss of 100 W per kVA, calculate the annual saving effected by their use. Allow 10% per annum for interest and depreciation.   6M

12 Draw the schematic block diagram arrangement of a steam power plant and explain each block.   10M

13 a) Explain the working of a nuclear reactor with a neat sketch.   5M

 b) How can solar energy be converted into electrical energy? Give a diagram showing the elements of such a plant.   5M

14 a) Define string efficiency. Explain various methods for improving string efficiency.   5M

 b) An over head line is erected across a span of 250 m on level supports. The conductor has a diameter of 1.42 cm and has a dead weight of 1.09 kg per meter. The line is subjected to a wind pressure of 37.8 kg per square meter of the projected area. The radial thickness of ice is 1.25 cm. Calculate the sag. Assume a maximum working stress of 1050 kg per square cm. One cubic meter of ice weighs 913.5 kg.   5M

15 Derive the expression for the inductance per phase of a 3- over head transmission line when (i) conductors are symmetrically placed and(ii) conductors are un symmetrically placed but the line is completely transposed.   10M

16 a) Explain various types of tariffs.   5M

 b) Explain the working of a gas turbine power plant with the help of neat block diagram.   5M

17 Write short notes on the following: 10M
 a) Testing of insulators.
 b) Prime movers for hydro electric plants.

****

FACULTY OF ENGINEERING

B.E IV-Semester (CBCS)(Inst)(Suppl.) Examination, December 2019

Subject : Transducer Engineering

Time: 3 Hours   **Max Marks: 70**

Note: Answer all questions from Part-A & Any Five questions From Part-B.

Part-A (20 Marks)

1   Identify the differences between Range and Span.   2m

2   A transducer is connected to a Multimeter with full scale deflection of 30V. If the
    meter reads 6.66V against a true value of 6V, then its error express in % of fsd is__   2m

3   Differentiate between Active and Passive transducer.   2m

4   Give an idea for temperature compensation in strain measurement.   2m

5   Why inductive proximity transducer is suitable for only metallic contact?   2m

6   Using suitable representation justify how hygrometer can be used for Greenhouse
    applications.   2m

7   State the principal of bimetallic strip thermometer. Give its range of measurement. 2m

8   Draw the characteristics curve of thermistor.   2m

9   Using suitable diagram describe the operation of U-tube manometer.   2m

10 A pressure gauge reads 180mm of Hg. What is the absolute pressure if the
    atmospheric pressure is 760 mm of Hg?   2m

Part-B (50 Marks)\

11 Explain the terms: Measurement, Calibration, Linearity, Hysteresis, and
    Repeatability.   10m

12 Find the impulse response of the first order system given

$$T(s) = \frac{5}{1+3S}$$

Also plot the response curve.   10m

13 a) Find the output expression of strain gauge measuring circuits using Wheatstone
       bridge for Full Bridge configuration.   5m
   b) Why temperature compensation is necessary for strain measurement? Suggest a
       mean for this.   5m

14 Explain the constructional details of different types of inductive transducers.   10m

15 a) Explain the Laws of thermocouple.   5m
   b) Explain the term triple point use in the calibration of temperature indicators. 5m

16 Discuss any four sensing elements use for the measurement of medium pressure.   10m

17 With short notes on:
    a) Non electrical type of pressure measurement
    b) Temperature measurement by Radiation method
    c) Capacitive Transducers.   10m

****

FACULTY OF ENGINEERING

B.E. (ECE) IV - Semester (CBCS) (Suppl.) Examination, December 2019

Subject : Probability Theory & Stochastic Process

Time : 3 Hours   Max. Marks: 70

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (20 Marks)

1   Define the postulates of Axiomatic approach to probability.   (2)

2   A biased coin is tossed till a head appears for the first time. What is the probability that the number of required tosses is odd?   (2)

3   Find a value for constant 'A' such that $f_x(x) = A (1- x^2) \cos(x/2)$ for $-1 \le x \le 1$ is a valid probability density function.   (2)

4   A random variable X has $\overline{X} = -3$, $\overline{X^2} = 11$ and $\sigma^2_x = 2$. For a new random variable Y=2X-3. Find mean and variance of random variable Y.   (2)

5   State and prove the properties of joint probability density function.   (2)

6   Random variables X and Y have the joint density function. Find all second order moments of X and Y

$$F_{X,Y}(x,y) = \begin{cases} (x+y)^2/40 & -1 < x < 1 \,\& -3 < y < 3 \\ 0 & otherwise \end{cases}$$ (2)

7   Define Autocorrelation function and state its properties.   (2)

8   If X(t) is a stationary random process having a mean value of 3 and autocorrelation function of $R_{XX}(\tau) = 9 + 2^{e-|\tau|}$, find variance of the random variable $Y = \int_0^2 X(t)dt$.   (2)

9   The power density spectrum of a WSS process is   (2)
$S_{XX}(\omega) = 4\pi u(\omega) + 3\pi u(\omega - 5f) + 3\pi u(\omega + 5f) + 2\pi u(\omega - 4) + 2\pi u(\omega + 4)$. Find mean and variance of X (t).

10 Define white noise and Colored noise.   (2)

PART – B (50 Marks)

11 (a) A pair of dice is rolled on every play and the player wins at once if the total for the first throw is 7 or 11 , loses at once if 2, 3, or 12 are rolled. Any other throw is called a "carry-over". If the first throw is a carry-over then the player throws the dice repeatedly until he wins by throwing the same carry-over again, or loses by throwing 7. What is the probability of winning the game?   (6)
   (b) State and prove theorem of Total probability.   (4)

..2

12 (a) A random variable has a probability density function given by (5)

$$F_x(x) = \frac{1}{\sqrt{8f}} \exp\left(-\frac{(x+3)^2}{8}\right)$$

Find (a) Pr (X > 4). (b) Pr(| X + 3 | < 2). (c)Pr (X ≥ 0)

(b) For a random variable whose probability density function is given by

$$f_X(x) = \frac{1}{2b}\exp\left(-\frac{|x|}{b}\right)$$ Where b > 0. Find the characteristic function and

variance of random variable X. (5)

13 (a) Prove that the density function of the sum of two statistically independent
random variables is the convolution of their individual density functions. (5)
(b) The joint density function of two random variables X and Y is

$$F_{X,Y}(x,y) = \begin{cases} \dfrac{(x+y)^2}{40} & -1 < x < 1 \,\&\, -3 < y < 3 \\ 0 & otherwise \end{cases}$$

Find the correlation coefficient.

14. A random process is defined by Y(t) = X(t)cos(w₀ + θ) where X(t) is a wide-sense
stationary random process that amplitude-modulates a carrier of constant angular
frequency w₀ with a random phase θ independent of X(t) and uniformly distributed
on (-π, π). Find
(a) E[Y(t)] (b) Autocorrelation of Y(t) (c) Is Y(t) wide-sense stationary (10)

15. Given that a process X(t) has the autocorrelation function
RXX(τ) = Δ. e^(-α|τ|) cos (w₀τ) where A > 0, α > 0 and w₀ > 0 are real constants.
Find the power spectrum of X(t). (10)

16 (a) Derive the relation between the PSD of the input and the output random
process of an LTI system. (6)
(b) State and prove the properties of cross-correlation function. (4)

17 A pair of random variables has a joint pdf specified by

$$f_{X,Y}(x,y) = abe^{-(ax+by)}u(x)u(y)$$ where a and b are real positive constants. Find (10)

(a) Joint CDF, $F_{X,Y}(x,y)$

(b) Marginal pdfs, $f_X(x)$ and $f_Y(y)$.

(c) Pr(X > Y)

*****

FACULTY OF ENGINEERING

B.E.(Mech.) IV – Semester (CBCS) (Suppl.) Examination, December 2019

Subject: Applied Thermodynamics

Time: 3 Hours   Max.Marks: 70

Note: Answer all questions from Part-A and any five questions from Part-B
PART-A (20 Marks)

1 What are the uses of compressed air?
2 What are the advantages of multi stage compression?
3 What is mist lubrication?
4 Define mean effective pressure.
5 Define Cetane number and what is the effect of lower cetane numbered fuel on engine performance.
6 What is after burning in engine combustion?
7 Classify Boilers.
8 What are boiler accessories give examples?
9 Sketch Carnot cycle.
10 Define Nozzle efficiency.

PART-B (5x10 = 50 Marks)

11 a) Derive the expression for a 2 stage reciprocating air compressor and show the amount of work saved on graph.
   b) A single stage reciprocating air compressor is required to compress 1kg of air from 1bar to 4bar. The initial temperature is 27°C. Compare the work requirements in the
   following cases.
      i)   Isothermal compression
      ii) Compression with $PV^{1.2}$=constant; and
      iii) Isentropic compression.

12 a) Explain the reasons for deviation of actual cycle from air standard cycles.
   b) The bore and stoke of a water cooled vertical ,single – cylinder four – stroke diesel engine are 80mm and 110mm respectively and the torque is 23.5Nm. Calculate the brake mean effective pressure of the engine.

13 a) Explain the stages of compression in CI engine.
   b) Define phenomenon of knocking in SI engine and mention effects of knocking.

14 a) Explain with the help of a neat sketch
      i)   Water level indicator
      ii) Steam stop value
      iii) Blow off cock
      iv) Fusible plug
   b) What are surface condensers explain any one type with the help of neat sketch

15 a) Explain Rankine cycle with regeneration.
   b) In a steam nozzle the steam expands from 4bar to 1 bar. The initial velocity is 60m/s and the initial temperature is 200^{0}C. Determine the exit velocity if the nozzle efficiency is 92%.

16 a) Explain the phenomenon of intercooling and after cooling in compressor.
   b) Sketch and explain simple carburetor.

17 a) Sketch any two types of combustion chamber for SI engines
   b) Sketch and explain Benson boiler
   c) Classify steam nozzles.

****

FACULTY OF INFORMATICS

B. E. IV - Semester (Prod.)(CBCS)(Supple.) Examination, December 2019

Subject : Applied Thermodynamics & Heat Transfer

Time : 3 Hours   **Max. Marks: 70**

Note: Answer all questions from Part-A & answer any five questions from Part-B.

PART – A (20 Marks)

1	Why intercooler is used in reciprocating air compressor?	2
2	Draw indicator diagram for two stage reciprocating air compressor with clearance and inter cooling?	2
3	With sketch, name the elements of simple carburettor?	2
4	For same power output, why 4 stroke engines are heavier as compared to 2 stroke engines?	2
5	Name different types of cooling systems used in IC engines?	2
6	Name different parts to be lubricated in IC engines?	2
7	How thermal conductivity of liquids and gases vary with temperature?	2
8	State Kirchhoff law of radiation ?	2
9	Write two dimensional conduction equation with heat generation at unsteady state ?	2
10	Write reciprocity theorem?	2

PART – B (50 Marks)

11 Describe the methods to improve isothermal efficiency of reciprocating air compressor?   10

12 (a) Compare SI engines with CI engines ?   5
    (b) Mention the factors to control knock in SI engines?   5

13 (a) Derive an expression for temperature distribution in a slab with variable thermal conductivity with temperature as $K=K_0(1+aT)$.   5
    (b) Derive an expression for overall heat transfer coefficient for heat transfer through cylinder with internal and external convection ?   5

14 (a) With sketch, discuss about battery ignition system in IC engine ?
    (b) Briefly describe different types of combustion chambers for CI engines?   5

15 State Buckingham pi theorem? Apply Buckingham pi theorem, to generate non dimensional numbers relevant to forced convection?   10

16 The following observation were recorded in a test of one hour duration in single cylinder oil engine working on four stroke cycle. Bore 300mm, stroke 450mm , fuel used 8.8 kg , calorific value of fuel 41800Kj/Kg , speed 200rpm , mean effective pressure 5.8 bar. Brake friction load 1860 N , Quantity of cooling water 650 Kg and its temperature rise 22°C , Diameter of brake wheel 1.22m , Draw heat balance sheet?   10

17 A composite cylinder consists of 10 cm radius steel pipe of 25mm thickness over which two layers of insulation 30mm and 35mm are laid. The thermal conductivities are 25 W/mK , 0.25 W/mK, and 0.65 w/mK . The inner side of cylinder is exposed to convection at 300°C with h=65 W/m^{2}K . Outside is exposed to air at 30°C with h= 15 W/m^{2}K . Determine heat loss per meter length. Also find interface temperatures?   10

****

FACULTY OF ENGINEERING
B.E. (A.E.) IV-Semester (CBCS) (Suppl.) Examination, December 2019

Subject : Metallurgy & Material Testing

Time : 3 Hours   **Max. Marks: 70**

Note: Answer all questions from Part-A & answer any five questions from Part-B.

PART – A (20 Marks)

1. Write the differences between slip and twinning.
2. What are surface defects? Explain grain boundary defects in crystals.
3. What are the metallurgical variables effecting the fatigue life?
4. State Fick's second law of diffusion.
5. Define the terms solid solution, compound and mixture.
6. List the properties of grey cast iron.
7. Sketch Austempering heat treatment process.
8. What is quenching? List the various types of quenching media used in hardening.
9. Sketch the principle of magnetic particle testing.
10. What is hardness? List the methods employed to determine the hardness of steel.

PART – B (50 Marks)

11. (a) State cold working and hot working processes. What are the advantages of cold working compared to hot working?
    (b) Distinguish ductile fracture with brittle fracture.

12. (a) Explain the difference between creep curve and stress rupture curve.
    (b) What is cumulative fatigue? How do you estimate the fatigue damage in metals?

13. (a) Draw and explain the cooling curves for i) Pure metal, ii) Solid solution and iii) Eutectic alloys.
    (b) What are plain carbon steels? Explain different types of plain carbon steels.

14. (a) Discuss normalizing as heat treatment process and mention its applications.
    (b) What is case hardening? Explain carburizing process.

15. (a) Explain the factors to be considered in selecting the material for
       i) Cylinder head and   ii) Clutch plate.
    (b) What is toughness? Explain the method of estimation of toughness using Izod test.

16. (a) Explain experimental determination of fatigue strength with the help of a neat sketch.
    (b) Write the composition, properties and applications of ductile cast iron.

17. Write short notes on the following.
    (a) Bauschinger effect
    (b) Induction hardening
    (c) Ultrasonic test

*****

FACULTY OF ENGINEERING
B.E. (CSE) IV-Semester (CBCS)(Suppl.) Examination, December 2019

Subject : Object Oriented Programming Using Java

Time : 3 Hours   Max. Marks: 70

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (20 Marks)

1 Explain the significance of each word in public static void main (string args[]).   2
2 Give the syntax for declaring a two dimensional array of different row sizes.   2
3 Write a simple program that uses Print Writer class to handle console output.   2
4 What are different states of a thread? Explain with a diagram.   2
5 List the different Collection Interfaces and Collection Classes.   2
6 Write a simple program to demonstrate String Tokenizer.   2
7 List the commonly used Event Listener interfaces.   2
8 What are two different event handling mechanisms? Brief about each on.   2
9 What is serialization? Which type of objects cannot be serialized?   2
10 Mention the two key features that define the essence of Swing.   2

PART–B (50 Marks)

11 (a) Write a program that illustrates how to define and use an inner class.   5
   (b) Write a program that demonstrates the use of vararg. (type …v)   5

12 (a) How is it possible to disallow a method from being overridden? Illustrate with
       an example.   5
   (b) What are nested interfaces? Write a simple program to illustrate a nested
       interface.   5

13 (a) Write a program to sort a set of strings using Bubble sort.   5
   (b) Write a program to reverse a collection with the help of list Iterator() and
       Collection. reverse () methods of Collection and List Iterator class.   5

14 (a) Write a program to demonstrate Border Layout.   5
   (b) Write a program to display two text fields to read two numbers and perform
       simple arithmetic operation.   5

15 (a) Write a program to create a child frame window from within an Applet.   5
   (b) Write a program to create three buttons labeled "Yes", "No" and "Undecided".
       Each time a button is pressed, a message has to be displayed that reports
       which button has been pressed.   5

16 (a) Write a program to read a string from console using Buffered Reader.   5
   (b) Write a program to display contents of a file.   5

17 Write short note on:
   (a) Multiple catch clause   3
   (b) Thread priorities   3
   (c) Wrapper classes   4

*****

FACULTY OF ENGINEERING
B.E. (I.T.) IV - Semester (CBCS) (Suppl.) Examination, December 2019

Subject : OOP Using JAVA

Time : 3 Hours   Max. Marks: 70

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (20 Marks)

1 What is garbage collection in java?
2 Define Nested and Inner classes.
3 Write about two uses of super keyword.
4 Differentiate between interface and abstract class.
5 What are checked and unchecked exceptions in Java?
6 List any 4 Collection interfaces.
7 Briefly explain FileInputStream and FileOutputStream Classes.
8 List different Event classes in java.
9 Differentiate between an Applet and Java Application.
10 Write an applet to draw several straight lines.

PART – B (50 Marks)

11 a) What is an Abstract class? Discuss about different aspects of Abstract
      classes and write program to demonstrate it in an inheritance hierarchy. [6]
   b) Briefly explain about Object class in Java.   [4]

12 a) Write about different ways to create a thread in java program? Write a
      program to create a thread using any one of the way.   [6]
   b) Draw the Exception Classes Hierarchy in java and indicate checked/
      unchecked classes in the hierarchy.   [4]

13 Illustrate about Delegation Event Model in Java, and write a program to
   demonstrate how to handle the Mouse Events.   [10]

14 What are AWT Controls? Write a program to demonstrate following AWT
   controls: Checkboxes, CheckboxGroup, Choice, and TextField.   [10]

15 a) What is meant by Synchronization? Write a program to show how to
      synchronize inter thread communication.   [6]
   b) Write a program to demonstrate partial implementation of an interface.   [4]

16 a) Write in detail about following Stream Classes: FileReader, FileWriter.
      Write a program using FileWriter class to write some text data to a file. [6]
   b) Write about the applet life cycle.   [4]

17 Write short notes on following: [10]
   (a) Packages
   (b) Array List Collection class
   (c) Linked List Collection Class
   (d) Final keyword in java

*****

FACULTY OF ENGINEERING
B. E. 2/4 (Civil) II – Semester (Backlog) Examination, December 2019

Subject: Fluid Mechanics - I

Time: 3 hours   **Max. Marks: 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (10 x 2.5 = 25 Marks)

1. Differentiate between real fluids and ideal fluids.
2. Define buoyancy and centre of buoyancy.
3. State Bernoulli's equation. How it is modified to real fluids.
4. What is momentum correction factor? State its significance.
5. Differentiate between manometers and piezometers.
6. What are the advantages of triangular notch?
7. Define Mach number and Mach cone. Mention the applications.
8. Write the continuity and energy equations for compressible fluids.
9. Define compound pipe and equivalent pipe.
10. What is friction factor? How friction factor varies with Reynold's number?

PART – B (50 Marks)

11. (a) Define surface tension and bulk modulus of elasticity. Explain the significance of vapour pressure in engineering applications.   5

    (b) The velocity distribution for flow over a flat plate is given by $u = 2y - y^2$ in which u is the velocity at a distance 'x' above the plate. Determine the shear stress at y = 0.1m. Assume dynamic viscosity as 8.6 poise.   5

12. (a) Define the terms total pressure and centre of pressure. Derive an expression for total pressure and centre of pressure for a submerged vertical plate.   5

    (b) A 30 cm diameter pipe conveying kerosene branches into two pipes of diameter 20 cm and 15 cm respectively. If the average velocity in the 30 cm diameter pipe is 2.5 m/s, and the average velocity in 20 cm diameter pipe is 2 m/s, find the velocity of flow in 15 cm diameter pipe.   5

13. (a) State Euler's equation of motion. Derive Bernoulli's equation along a streamline. List all the assumptions.   5

    (b) Water is flowing through a pipe line having diameters 30 cm and 15 cm at the bottom and upper end respectively. The intensity of pressure at bottom and upper end are 15N/cm^2 and 10 N/cm^2. Determine the difference in datum head if the rate of flow through the pipe is 50 m$^{3/s}$.   5

14. (a) Explain the various pressure measuring devices with neat sketches.   5

    (b) A vertical venturimeter 40 cm by 20 cm is provided in a vertical pipe to measure the flow of oil of specific gravity 0.8. The difference in elevations of the throat section and the entrance section is 1 m. The direction of flow of oil is vertically upwards. The oil mercury differential gauge shows deflections of mercury equal to 40 cm. Determine the quantity of oil flowing in the pipe. Neglect losses.   5

…..2

15. (a) Derive the expression for velocity of sound wave in compressible fluid.　　5
    (b) Find the Mach number when an aeroplane is flying at a velocity of 1000 km/hr through still air having pressure of 7 N/cm^2 and temperature of -5^0C.　Take R = 287.4J/kg ^{0}K.　Also calculate the stagnation pressure and stagnation temperature of air.　Assume　k = 1.4.　　5

16. (a) Derive Darcy Weisbach equation.　　5
    (b) A 50 cm diameter pipe of length 500 m is connected in series to a 30 cm diameter pipe of length 300 m　to convey discharge of water.　Assume that the friction factor remains the same for the both the pipes and the minor losses are negligible.　Determine:
    (i)　an equivalent length of 40 cm diameter pipe and
    (ii)　an equivalent size of pipe of 800 m length.　　5

17. Write short notes on　　3+4+3
    (a) Rotameter
    (b) Reynold's experiment
    (c) Minor losses.

******

FACULTY OF ENGINEERING

B. E. 2/4 (EEE/Inst.) II – Semester (Backlog) Examination, December 2019
Subject: Electro Magnetic Fields

Time: 3 hours   **Max. Marks: 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1. Define Electric Flux Density and write the relation with Electric field Intensity.   2
2. Define Gauss Law and write the formula for it.   3
3. Explain magnetic boundary conditions.   3
4. Write the formula for Energy stored in magnetic field & unit of each term.   2
5. Derive the formula for Laplace equation and Poisson's equation.   3
6. Write 2 similarities between Electrical and magnetic circuits.   2
7. Write two Maxwell's equation in integral form for static Electric field.   2
8. Explain types of current densities.   3
9. Write the field equations in vector forms for energy storage in electric fields.   3
10. Define Velocity and Wave length and also write the units.   2

PART – B (50 Marks)

11. Derive D and E for a sphere whose charge density is ρ_v(col/m^3) & graph for E vs r.   10

12. Derive the electric field and potential distribution and capacitance per unit length of a co-axial cable.   10

13. Derive expression for inductance of a toroid and L for Solenoid.   10

14. Write Maxwell's equation for time varying fields in point and integral form and explain.   10

15. Explain MOM method.   10

16. (a) Derive relation between E and V.   5

     (b) Explain boundary conditions for Electric fields.   5

17. (a) Explain coulombs' law and derive F in vector form.   5

     (b) Explain Biot-Savart's law and derive H in vector form.   5

******

FACULTY OF ENGINEERING

B.E. 2/4 (ECE) II – Semester (Backlog) Examination, December 2019

Subject: Networks and Transmission Lines

Time: 3 Hours   **Max.Marks: 75**

Note: Answer all questions from Part – A and any five questions from Part – B .

PART – A (25 Marks)

1. Define image impedance and image transfer constant of an asymmetrical network.   2

2. What are the electrical properties of symmetrical network?   2

3. Derive the condition for a filter to lie in pass band.   2

4. Design a constant 'K' high pass filter with a cut-off frequency 3KHZ and a nominal impedance of 600Ω.   3

5. Design a symmetrical 'T' attenuator with an attenuator of 40 db and $R_o=600Ω$.   3

6. What are the inverse networks? Give example.   2

7. Determine reflection co-efficient and VSWR for   3
   a) Open Circuit-ed Line
   b) Short Circuit-ed Line.

8. What is the condition for a line to be distortion-less? Define various types of distortions.   3

9. On a transmission line terminated in a load VSWR is measured as '2'.What % of power will be reflected back?   3

10. What are the applications of Smith chart?   2

PART – B (5x10 = 50 Marks)

11. a) Find the characteristic impedance and attenuation constant of the network shown in Fig. below: 5
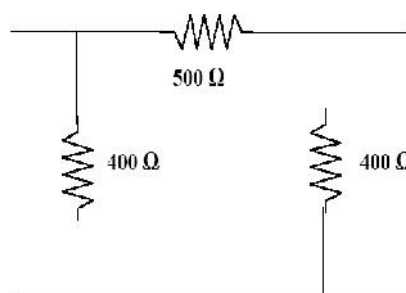
b)   Determine characteristic impedance and propagation constant for given lattice network.   5
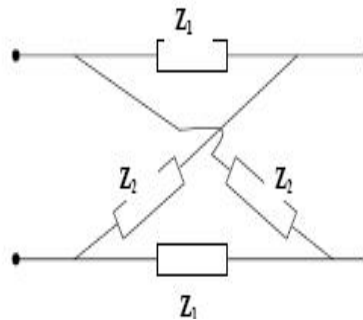
12 Design composite T section low pass filter with the specifications given R_k =600   , f_c=1kHz, f =1.2kHz.   10

13 a) Design L type matching section to match 400   to 100   impedance.   4

   b) The driving point impedance of a LC Network is given by Z(S)= S^4+4S^2+3/S^3+2S. Determine the second cauer form of the network.   6

14 Derive the transmission line equations and the formula for input impedance in terms of
   Zo, l, γ and Zr ,where these parameters have useful meaning.   10

15 a) Explain the properties of Smith Chart.   4
   b) A 7m lossless line with Z_o = 75   is terminated in an impedance Z_R = 115-j80   . The wavelength of transmission line is 2.5m.Using the Smith chart, find reflection co-efficient, SWR and input impedance .   6

16 a) Define phase velocity and group velocity and establish relation between them in details.   5
   b) Compare single stub matching with double stub matching.   5

17 Write short notes on: 10
   a) Quarter wave transformer
   b) Loading of a line
   c) Positive Real function

****

FACULTY OF ENGINEERING
BE 2/4 (m/p) II-semester (Backlog) Examination, December 2019
subject: Basic Electronics

Time: 3 Hours　　　　　　　　　　　　　　　　　　　　**Max. Marks: 75**
Note: Answer all questions from part –A   and any five from Part-B

Part-A (25 Marks)

1) What are the applications of diode　　　　　　　　　　　　　　　　　　2

2) What is ripple factor? What is the significance of Ripple factor　　　　　2

3) Define alpha beta gama for BJT and Derive the relation between them.　　2

4) What is pinch off voltage of JFET?　　　　　　　　　　　　　　　　　2

5) What is an Oscillator circuit? Give an example of usage of Oscillator in our daily life.　　2

6) What are the advantages and disadvantages Positive feedback　　　　　3

7) What is an op-amp? Draw its Symbol and equivalent circuit.　　　　　　3

8) What are universal gates? Write their truth tables.　　　　　　　　　　3

9) What is the use of EHT in CRO?　　　　　　　　　　　　　　　　　　3

10) What is Force Transducer?　　　　　　　　　　　　　　　　　　　　3

Part-B (50 Marks)

11) Draw a neat circuit for FWR .derive the Idc, Vdc, Irms, Ripple factor, PIV.　　10

12 a) Draw a neat circuit diagram for equivalent h parameter model of Common Emitter
　　circuit. Derive its H-parameters　　　　　　　　　　　　　　　　　5
　b) Explain the construction and working of N-channel JFET.　　　　　　5

13)　Draw a neat circuit diagram of the Hartley oscillator and derive the frequency of
oscillations and condition for oscillations　　　　　　　　　　　　　　10

14)a) Show the working of OP-AMP as Integrator and derive the equation for the output.　　5
　b) Show the working of OP-AMP as Differentiator and derive the equation for the
output　　　　　　　　　　　　　　　　　　　　　　　　　　　　5

15)a) What is LVDT? Explain.　　　　　　　　　　　　　　　　　　　5
　b) Explain Bounded and Unbounded Strain Gauge.　　　　　　　　　5

16 a) Explain the construction working of SCR　　　　　　　　　　　　5
　b) Explain the V-I Characteristics of SCR.　　　　　　　　　　　　5

17) Write short notes on
　a) Hall effect　　　　　　　　　　　　　　　　　　　　　　　　3
　b) LED　　　　　　　　　　　　　　　　　　　　　　　　　　3
　c) Feedback amplifiers.　　　　　　　　　　　　　　　　　　　4

******

FACULTY OF ENGINEERING

BE 2/4 (AE) II-Semester. (Backlog) Examination, December 2019

Subject : Thermal Engineering

Time : 3 Hours   **Max. Marks: 75**

Note : Answer all questions from Part A and any five questions from Part B.

PART – A (25 Marks)

1 What is steady flow energy equation (SFEE)   2

2 What is Zeroth law of Thermodynamics. Show that it is basis of temperature
measurement.   3

3 What is PMM-II.   3

4 Define heat engine, refrigerator and heat pump.   3

5 Sketch P-V diagram of Brayton cycle Explain processes.   3

6 Define dryness fraction of steam.   2

7 What is after cooling and intercooling in compressors.   2

8 What are the components of vapour absorption system.   2

9 Define Fourier law of heat conduction.   3

10 Define and classify heat exchangers.   2

PART – B (50 MARKS)

11 10 kg of fluid per minute goes through a reversible steady flow process. The
Properties of the fluid at the inlet are P_1=1.5 bar, $_1$=26kg/m^3, c_1=110m/s and u_1=910
kJ/kg and at the exit are P_2=5.5 bar , $_2$=5.5 kg/m^3 c_2=190m/s and u_2= 710kJ/kg.
During the passage, the fluid rejects 55kJ/s and rises through 55 metres. Determine
(i) The change in enthalpy(h) (ii) Work done during the process.   10

12 (a) Derive an expression for the efficiency of the reversible heat engine.   5
   (b) A heat engine is supplied heat at the rate of 1700kJ/min and gives an output of
       9kW. Determine the thermal efficiency and the rate of heat rejection.   5

13.(a) Explain how the process of reheating improves the efficiency.   5
   (b) A Simple Rankine cycle works between pressure of 30 bar and 0.04 bar, the
       initial condition of steam being dry saturated Find(i)cycle efficiency
       (ii) Specific steam consumption. (iii) Work Ratio.   5

14. (a) Derive the expression for condition for minimum work in case of 2- stage
        reciprocating air compressor with perfect intercooling.   6
    (b) Compare Vapour compression and Vapour absorption refrigeration systems. 4

15. (a) What are dimensionless number state their significance.   3
    (b) The inner surface of a plane brick wall is at 60°C and the outer surface is at
        35°C. Calculate the rate of heat transfer per m^2 of surface area of the wall, which
        is 220mm thick. The thermal conductivity of the brick is 0.51W/m$^\circ$C.   7

16. (a) Define Black body, White body and Grey body.   5
    (b) What are the desirable properties of an ideal refrigerant.   5

17. (a) What are the limitation of first law of thermodynamics.   5
    (b) Explain thermodynamic equilibrium.   5

****

FACULTY OF ENGINEERING

BR 2/4 (C.S.E) II Semester (Backlog) Examination, December 2019
Subject: Microprocessor & Interfacing

Time: 3 Hours   **Max. Marks: 75**

Note: Answer all questions from Part – A & Any five questions from Part – B

Part – A (25 Marks)

1. List the main applications of 8 bit Microprocessor   2
2. What do you mean by "Data Width"?   2
3. List the control and status signals available in 8085?   3
4. Write any two advantages of segment registers in 8086   2
5. What is programmed I/O?   2
6. List the major components of Keyboard/Display interface?   2
7. What is the value of AL after executing the following instructions   3

   MOV AL, 35H

   ADD AL, 49H

   DAA

8. What is difference between DIV and IDIV instruction in 8086?   3
9. List the Special Function Registers (SFRs)   3
10. Draw the program Memory Organization in 8051?   3

Part – B (50 Marks)

11. Draw the schematic pin diagram of 8085 MP and explain the various functions of 8085MPU   10

12. a) Write an ALP to find the Odd number in a given array of numbers 04H, 08H, 06H and 05H using 8085A   5

    b) Explain successive approximation technique to convert analog data to digital data   5

13. With the help of block diagram explain the internal architecture of IC 8279 and describe its working in detail   10

14. With the help of Timing Diagram explain the different working modes of PIT 8254   10

15. Explain in detail about the functional block diagram of 8051 microcontroller architecture.   10

16. a) Discuss the features of advanced microprocessor of 80386 and 80486   5

    b) Explain the Timer operation of 8051   5

17. With the help of block diagram explain the internal architecture of 8086 and describe its working in detail.

****

FACULTY OF ENGINEERING

B.E 2/4 II-Semester (I.T) (Backlog) Examinations, December 2019

SUBJECT: Computer Organization and Microprocessors

Time: 3 Hours   **Max Marks: 75**

Note: Answer all Questions from PART –A and any five Questions from PART-B.

PART - A (25 Marks)

1. What is an Interrupt? Give an example.   2
2. List the features of DMA Controller.   3
3. Explain the significance of each bit of Flag Register.   2
4. List the various phases of instruction cycle.   3
5. List the various indirect addressing modes.   3
6. Define SPEC Rating.   2
7. What is a Subroutine. List the various instructions used for Subroutines.   3
8. Define Hit Ratio.   2
9. Write briefly about the significance of Virtual Memory.   2
10. Write the functions of 8253.   3

PART – B (50 Marks)

11. a. Explain the various functional units of a computer system.   5
    b. Draw the Block diagram of Interrupt Hardware and Explain.   5

12. Explain in detail about the Mapping techniques used to map the data from main memory to Cache memory.   10

13. Draw the Pin Diagram of 8085 and explain the function of each Pin in detail.   10

14. a. Explain various addressing modes of 8085 with examples.   5
    b. Write an ALP to sort the numbers in ascending order.   5

15. Explain about 8257 (DMA Controller) with a neat Block Diagram.   10

16. a. Explain about the various 8085 interrupts in detail.   5
    b. Explain about A/D and D/A convertor with a suitable Block Diagram.   5

17. a. Explain about 8255 in I/O mode with neat sketch.   5
    b. Explain about IEEE 488 Standard   5

****